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**Bibliography**

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(71) [Applicant]

[Identification Number] 000115108

[Name] Uni Charm Corp.

[Address] 182, Kinsei-cho Shimobun, Kawanoe-shi, Ehime-ken

(72) [Inventor(s)]

[Name] Mizutani \*\*

[Address] 1531-7, Takasuka, Wadahama, Toyohama-cho, Mitoyo-gun, Kagawa-ken  
Inside of a Uni Charm Corp. technical pin center,large

(72) [Inventor(s)]

[Name] Tagami Etsuko

[Address] 1531-7, Takasuka, Wadahama, Toyohama-cho, Mitoyo-gun, Kagawa-ken

Inside of a Uni Charm Corp. technical pin center, large

(74) [Attorney]

[Identification Number] 100085453

[Patent Attorney]

[Name] Nozaki Teruo

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**An epitome**

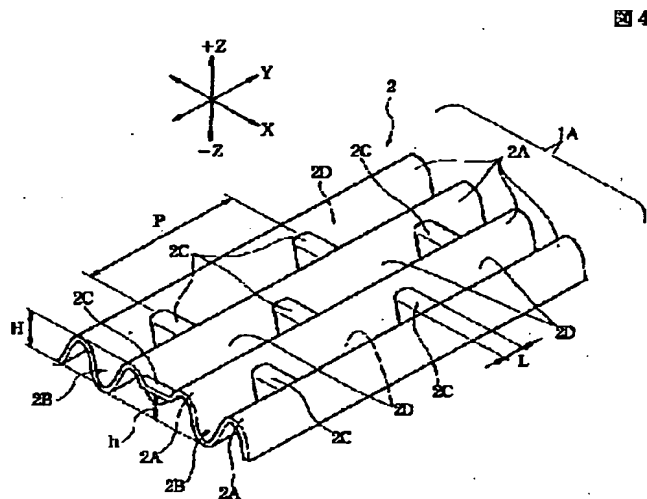
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**(57) [Abstract]**

[Technical problem] Since it was what it is hard to recover to the original initial form even if it was easy to deform when body pressure was received and was opened from body pressure, since the conventional surface sheet was what [ only ] only made the nonwoven fabric the wave configuration, a feeling of software and its cushioning properties were low.

[Means for Solution] A nonwoven fabric is made into a wave configuration and two or more connection section 2C which connects Yamabe 2A of both the side in trough 2B of said wave configuration is prepared. Thereby, since Yamabe 2A is connected through the elasticity of connection section 2C, deformation of Yamabe 2A is made to a min thing. Moreover, also when body pressure is opened, it becomes easy to return to the original configuration with the elasticity of said connection section 2C. Therefore, it can consider as the surface sheet 2 excellent in a feeling of software, and cushioning properties.

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**CLAIMS**

[Claim(s)]

[Claim 1] In an absorptivity article with which a surface sheet of liquid permeability which leads elimination liquid discharged from the inside of the body to said absorption layer is installed in a \*\*\*\* side of an absorption layer on said surface sheet An absorptivity article characterized by being formed crosswise a trough and Yamabe suitable for a \*\*\*\* side are prolonged in a longitudinal direction, and intersect perpendicularly with said longitudinal direction crosswise in the shape of a wave, and forming in convex the connection section which connects Yamabe located in said trough at both sides of this trough, and Yamabe towards a \*\*\*\* side.

[Claim 2] Said connection section is an absorptivity article according to claim 1

which is what connects the inclined planes of two flanks of Yamabe.

[Claim 3] An absorptivity article according to claim 1 or 2 with which said connection section is formed in a longitudinal direction at a fixed gap along with said trough.

[Claim 4] An absorptivity article according to claim 3 whose gap of a longitudinal direction of said connection section is 5mm or more 30mm or less.

[Claim 5] Said heights currently formed in said trough are absorptivity articles according to claim 1 to 4 which shift a location to said longitudinal direction and are formed in it between adjacent troughs.

[Claim 6] An absorptivity article according to claim 1 to 5 whose length of said cross direction of a crowning of said connection section is 1mm or more 10mm or less.

[Claim 7] An absorptivity article according to claim 1 to 6 with which a height size (h) from a pars basilaris ossis occipitalis of said trough to a crowning of said connection section is formed in 20% - 80% of range when a height size (H) from a pars basilaris ossis occipitalis of said trough to Yamabe's crowning is made into 100%.

[Claim 8] An absorptivity article according to claim 1 to 7 whose fiber density of a surface sheet in said connection section is low density from fiber density of troughs other than said connection section.

[Claim 9] An absorptivity article according to claim 1 to 7 whose relation of fiber density in each part of said surface sheet is the crowning of pars-basilaris-ossis-occipitalis > Yamabe, a trough.

[Claim 10] An absorptivity article according to claim 1 to 9 whose relation of fiber density in each part of said surface sheet is Yamabe's top > Yamabe's flank.

[Claim 11] An absorptivity article according to claim 9 or 10 whose relation of fiber density in each part of said surface sheet is Yamabe's top > connection section >= Yamabe's flank.

[Claim 12] An absorptivity article according to claim 1 to 11 which a rear face of a pars basilaris ossis occipitalis of said surface sheet has fixed in said absorption layer.

[Claim 13] Said surface sheet is an absorptivity article according to claim 1 to 12 with which two or more sheet laminating of the nonwoven fabric containing hydrophobic fiber is carried out.

[Claim 14] (a) A process which forms a surface sheet on both sides of a nonwoven fabric supplied in the fixed direction with the 1st shaping means and the 2nd shaping means, (b) It has a process which installs a surface sheet fabricated at said process in a \*\*\*\* side of an absorption layer. Said 1st shaping means It has a convex rib and a slot which were formed crosswise which extends along the supply direction of a nonwoven fabric, and intersects perpendicularly with said supply direction by turns. Said 2nd shaping means It has a convex rib and a slot which extended in said supply direction and were formed crosswise [ said ] by turns. To said convex rib A surface sheet which a gap is opened in said supply direction, and two or more hollows are formed, and is formed at a process of the above (a) With Yamabe pressurized between a convex rib of the 1st shaping means, and a slot of the 2nd shaping means

A trough pressurized between a slot of the 1st shaping means, and a convex rib of the 2nd shaping means, The convex connection section formed so that between Yamabe of both sides might be connected by said trough in a portion equivalent to a hollow of said 2nd shaping means is formed. At a process of the above (b) A manufacture method of an absorptivity article characterized by what is fixed on a front face of said absorption layer so that Yamabe of said surface sheet and a trough may be turned to a \*\*\*\* side.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] Especially this invention relates to the absorptivity article equipped with the surface sheet which was excellent in a feeling of softness, and cushioning properties, and was excellent in firmness, and its manufacture method with respect to absorptivity articles, such as a sanitary napkin, a panties liner, and an incontinence pad.

[0002]

[Description of the Prior Art] The absorptivity article which equipped the \*\*\*\* side of an absorption layer with the surface sheet of liquid permeability is indicated by for example, the \*\*\*\*\* No. 502000 [ ten to ] official report etc.

[0003] the health napkin indicated by said \*\*\*\*\* No. 502000 [ ten to ] official report — a supporters 7 top — a wave — the cover layer 9 which has 10 is formed, and leakage prevention of body fluid can be aimed at from this wave, and the wear amenity is increased by wave-like flexibility

[0004]

[Problem(s) to be Solved by the Invention] however — the health napkin indicated by this official report — a wave — the time of the cover layer 9 which has 10 contacting the skin — a wearer's body pressure — a wave — it is easy to transform

10 flatly, or easy to produce the failure by width in wave 10. moreover, the time of wearing — body pressure — changing — a wave — the time of the welding pressure which acts on 10 declining — a flat condition or the condition of the failure by width to the cover layer 9 — the original wave — the configuration of 10 — restoring — a difficulty pile. Consequently, a cover layer 9 cannot stick to a wearer's skin in the always optimal condition, but horizontal leakage is produced and there is a problem to which elimination liquid spreads within an absorptivity article beyond the need, and the feeling of software to the skin and cushioning properties fall.

[0005] This invention is for solving the above-mentioned conventional technical problem, and even when body pressure changes, it can hold in the condition that the wave of a surface sheet is always the same, and the adhesion to a wearer's skin does not fall, but it aims at offering the absorptivity article which can always maintain a feeling of software, and cushioning properties, and its manufacture method.

[0006]

[Means for Solving the Problem] In an absorptivity article with which a surface sheet of liquid permeability with which this invention leads elimination liquid discharged from the inside of the body at a \*\*\*\* side of an absorption layer to said absorption layer is installed on said surface sheet It is characterized by being formed crosswise where a trough and Yamabe suitable for a \*\*\*\* side are prolonged in a longitudinal direction, and intersect perpendicularly with said longitudinal direction in the shape of a wave, and forming in convex the connection section which connects with said trough Yamabe located in both sides of this trough, and Yamabe towards a \*\*\*\* side.

[0007] The failure by width can be made hard for Yamabe to become flat with body pressure, or to produce, since the connection section which connects between Yamabe of a surface sheet is prepared in absorptivity articles of this invention. Moreover, temporarily, even if the failure by width etc. arises, when said body pressure falls, flat or in order that the connection section may act elastically, it is easy to restore Yamabe to the original condition. Therefore, even when an adhesion condition of a surface sheet and the skin changes with motions of a wearer's body, a motion of the body is followed, and Yamabe of said surface sheet does flat *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne., can restore now, and can maintain adhesion to the skin in the always high condition. Therefore, elimination liquid cannot spread easily on a front face of a surface sheet, and can prevent horizontal leakage effectively. Moreover, a feeling of software or a feeling of a cushion which are given to a wearer do not fall.

[0008] For example, said connection section connects the inclined planes of two flanks of Yamabe. If it is formed in one so that the connection section may connect inclined planes, when a pressure acts on Yamabe and the pressure declines, an inclined plane will start and it will become easy to restore Yamabe.

[0009] Moreover, it is desirable that said connection section is formed in a

longitudinal direction at a fixed gap along with said trough. In this case, it is desirable that a gap of a longitudinal direction of said connection section is 5mm or more 30mm or less.

[0010] Thus, if the connection section has arranged at a fixed gap in a trough, in the whole region of a surface sheet, wave-like stability will become good. Moreover, as for said heights currently formed in said trough, it is desirable to shift a location to said longitudinal direction and to be formed in it between adjacent troughs.

[0011] Thus, if the connection section shifts a location and is formed, the connection section will become easy to restore each of two or more Yamabe. Moreover, it becomes easy to prevent diffusion to a longitudinal direction of elimination liquid. Moreover, it is desirable that the length of said cross direction of a crowning of said connection section is 1mm or more 10mm or less.

[0012] Furthermore, when a height size (H) from a pars basilaris ossis occipitalis of said trough to Yamabe's crowning is made into 100%, that of \*\* in which a height size (h) from a pars basilaris ossis occipitalis of said trough to a crowning of said connection section is formed in 20% - 80% of range is desirable. A wave-like reload function according that it is said under range to the connection section falls. Moreover, if said range is exceeded, the connection section will become easy to be equivalent to the skin, and a wearing feel to the skin will worsen.

[0013] Furthermore, it is desirable that fiber density of a surface sheet in said connection section is low density from fiber density of troughs other than said connection section. Thus, when the connection section was made into low density and elimination liquid tends to spread along with a trough, a function in which the connection section of said low density prevents diffusion of elimination liquid can be demonstrated. Moreover, it excretes in a portion of this low density. Liquid can be penetrated quickly and it can give an absorption layer now.

[0014] Moreover, it is desirable that relation of fiber density in each part of said surface sheet is the crowning of pars-basilaris-ossis-occipitalis > Yamabe, a trough, and it is desirable that it is Yamabe's top > Yamabe's flank, and it is still more desirable that it is Yamabe's top > connection section >= Yamabe's flank. And relation of fiber density most preferably kicked to each part of said surface sheet is the inclined plane of top > connection section >= Yamabe's [ of pars-basilaris-ossis-occipitalis > Yamabe, a trough, ] flank.

[0015] Thereby, a feeling of the touch and cushioning properties of a surface sheet can be raised. Since elimination liquid can be made furthermore hard to diffuse crosswise [ of a trough / a longitudinal direction and crosswise ], leakage from a edge of the cross direction of a napkin and a longitudinal direction can be suppressed. Therefore, in order to absorb elimination liquid promptly from a surface sheet to an absorption core, there is no liquid remainder on a surface sheet, and a dry feeling always carried out entirely can be obtained.

[0016] Moreover, it is desirable that a rear face of a pars basilaris ossis occipitalis of said surface sheet has fixed in said absorption layer. If a pars basilaris ossis

occipitalis of a surface sheet has fixed in an absorption layer, it will be hard coming to generate a location gap with a surface sheet and an absorption layer.

[0017] As for said surface sheet, it is desirable that two or more sheet laminating of the nonwoven fabric containing hydrophobic fiber is carried out. For example, if two or more surface sheets are formed for bulky nonwoven fabrics, such as an Ayr through nonwoven fabric, in piles, a feeling of software and cushioning properties of a surface sheet can be raised.

[0018] Moreover, a process which forms a surface sheet on both sides of a nonwoven fabric which supplies a manufacture method of an absorptivity article of this invention in the (a) fixed direction with the 1st shaping means and the 2nd shaping means, (b) It has a process which installs a surface sheet fabricated at said process in a \*\*\*\* side of an absorption layer. Said 1st shaping means It has a convex rib and a slot which were formed crosswise which extends along the supply direction of a nonwoven fabric, and intersects perpendicularly with said supply direction by turns. Said 2nd shaping means It has a convex rib and a slot which extended in said supply direction and were formed crosswise [ said ] by turns. To said convex rib A surface sheet which a gap is opened in said supply direction, and two or more hollows are formed, and is formed at a process of the above (a) With Yamabe pressurized between a convex rib of the 1st shaping means, and a slot of the 2nd shaping means A trough pressurized between a slot of the 1st shaping means, and a convex rib of the 2nd shaping means, The convex connection section formed so that between Yamabe of both sides might be connected by said trough in a portion equivalent to a hollow of said 2nd shaping means is formed. At a process of the above (b) It is characterized by what is fixed on a front face of said absorption layer so that Yamabe of said surface sheet and a trough may be turned to a \*\*\*\* side.

[0019]

[Embodiment of the Invention] Hereafter, this invention is explained with reference to a drawing. The plan and drawing 2 which show a sanitary napkin from a \*\*\*\* side as a gestalt of operation of an absorptivity article [ in ] show the cross section of the direction of X of drawing 1 , an IIA-IIA line cross section and (B) show an IIB-IIB line cross section, drawing 3 shows the cross section of the direction of Y of drawing 1 , and (A) of A is a partial perspective diagram in which an IIIA-IIIA line cross section and (B) show an IIIB-IIIB line cross section, and drawing 4 shows only the surface sheet (skin contact side) of

[0020] As shown in drawing 2 , the sanitary napkin (absorptivity article) 1 consists of three layers of the absorption core (absorption layer) 3 which mainly absorbs elimination liquid, such as the surface sheet (surface structure object) 2 of liquid permeability, menstrual blood, and urine, and the rear-face sheet 4 of liquid impermeability. Said surface sheet 2 contacts the skin directly, is made to \*\*\*\* body fluid, such as menstrual blood discharged from people's inside of the body, and leads it to the absorption layer 3 prepared in the lower layer.

[0021] Said surface sheet 2 consists of the high air through nonwoven fabric of opening nature, a point bond nonwoven fabric, a span bond nonwoven fabric, a span race nonwoven fabric, a melt BURON nonwoven fabric, etc. with bulky. In addition, the air through nonwoven fabric which was excellent in bulky in property at cushioning properties is the most desirable.

[0022] Let hydrophobic synthetic fibers, such as PE [ PE (polyethylene) PP (polypropylene), PET (polyethylene terephthalate), and ]/PP, sheath-core mold fiber like PE/PET, or side-by-side mold fiber, be subjects as fiber used for said nonwoven fabric, for example. Furthermore, hydrophilic fiber, such as regenerated-cellulose fiber, such as rayon, may also be included.

[0023] Moreover, by lowering the rate of a draft at the time of the spinning of fiber, and raising whenever [ flexible ] to it, fiber itself may be finished softly. At this time, it is desirable to finish the ductility at the time of desiccation (the maximum tension distortion) to 120% or less so that the Webb reinforcement at the time of carrying out carding of the fiber can be maintained. In addition, if ductility exceeds 120%, web reinforcement will run short and sheet-ization will become difficult. In addition, it can balance the smoothness of fiber while it can maintain proper web reinforcement, if more desirable ductility is 60% - 100% of range and is this range.

[0024] Since it will be easy to produce the liquid remainder by capillary action if it is 1 denier or less, and a fiber denier may furthermore produce a hard feeling of a rough deposit when it is 6 deniers or more, as for a fiber denier, what is 1-6 deniers is desirable.

[0025] The superintendent officer of said surface sheet 2 has the desirable range of 20 g/m<sup>2</sup> from a viewpoint of the ease of carrying out of shaping, and the difficulty of being generated of the liquid remainder - 120 g/m<sup>2</sup>.

[0026] Said surface sheet 2 may consist of compound sheets on which you may be the nonwoven fabric of monolayer structure, and the nonwoven fabric of said monolayer structure of two or more sheets was put as shown in drawing 2 and drawing 3 . The superintendent officer of the nonwoven fabric of said monolayer structure has optimal 85 g/m<sup>2</sup>.

[0027] Moreover, when it is the compound sheet of three layers, about 0.5mm in superintendent officer 30 g/m<sup>2</sup> which made the PE/PET fiber of a 2.5 denier x51mm sheath-core mold sheet-ize by the air through method, CD reinforcement of 190g/inch, and thickness is mentioned for said surface sheet 2 as a nonwoven fabric of one layer of the three layers. In this case, that the 1st layer in contact with the skin raises a feeling of the touch like the sheath-core fiber of inside \*\*\*\*\* with few flares of fiber is desirable, and, as for the 2nd and the 3rd layer, what can earn bulky like the sheath-core fiber of for example, hollow structure, and can raise a feeling of software is desirable. Moreover, as for said skin contact side (front face) of the 1st layer, what the so-called chewiness of fiber was mitigated [ what ] and raised the touch is desirable by increasing the quantity of the amount of titanium oxide. More specifically, the amount of the titanium oxide contained in the skin

contact side of the 1st layer is made into 4% to the amount of the titanium oxide contained in the core part material of the line of the sheath-core structure in the non-skin contact side (rear face) of the 2nd, the 3rd layer, and the 1st layer being 0.5%.

[0028] As shown in drawing 1, skin contact section 1A which rose and fell in the abbreviation violin configuration is formed in the center of the surface sheet 2 of a sanitary napkin 1. Adhesion according to [on this application-of-pressure section 3a and / the absorption core 3 and the surface sheet 2] to the adhesives of a half melt mold as shown in drawing 2 (A) and (B), while the periphery and the surface sheet 2 of the absorption core 3 which were prepared in the upper layer side of the rear-face sheet 4 are pressurized in application-of-pressure section 3a — or it is fixed by means, such as heat joining. And the inside of the portion surrounded by said application-of-pressure section 3a is substantial skin contact section 1A.

[0029] As shown in drawing 1, drawing 2 (A), (B), drawing 3 (A), (B), and drawing 4, two or more Yamabe 2A and trough 2B to which said skin contact section 1A extends in a longitudinal direction (the direction of graphic display Y) are formed, and these Yamabe 2A and trough 2B are formed in the wave configuration by turns crosswise (the direction of graphic display X). As shown in drawing 3 (B) and drawing 4, connection section 2C which upheaves to convex is formed in the direction of a skin contact side (+ Z direction) which is the front-face side of the surface sheet 2 from the pars basilaris ossis occipitalis of trough 2B at said trough 2B. Said connection section 2C is formed so that the inclined planes of the flank of Yamabe 2A and 2A who is prolonged crosswise [said] and located in both the sides of trough 2B may be connected. And in one trough 2B, two or more connection section 2C is formed.

[0030] Connection section 2C of these plurality is formed in the gap P fixed to a longitudinal direction, and between connection section 2C and connection section 2C serves as long slot 2D. The range of the length of the cross direction of the crowning of said connection section 2C is 1mm – 10mm, and the range of it is 2mm – 6mm more preferably. In addition, since the feeling of softness by the wave may be \*\*\*\*(ed) when it is 10mm or more, an upright feeling may increase [if the length of the cross direction of said connection section 2C is 1mm or less, it will be hard coming to contribute it to recovery of a wave configuration, and] and a hard crease wrinkle may be produced, it is not suitable.

[0031] Moreover, the range of 5mm – 30mm is suitable for said gap P (the length of long slot 2D), and the range of it is 5mm – 20mm more preferably. This is because the feeling of softness by the wave becomes recoverability tends to fall [the wave configuration according that a gap P is 30mm or more to Yamabe 2A and trough 2B], and an upright feeling increases that it is 5mm or less, produce a hard crease wrinkle, and is easy to be spoiled.

[0032] As furthermore shown in drawing 4, when the crowning of said Yamabe 2A, the pars basilaris ossis occipitalis of trough 2B, and height H (height of a Z direction)

are made into 100%, as for height  $h$  to the crowning of connection section 2C from the pars basilaris ossis occipitalis of trough 2B, what is formed in 20% – 80% of range is desirable. If it is hard coming to contribute the height of connection section 2C to wave-like recovery to be said under range and it exceeds said range, connection section 2C will become easy to be equivalent to the skin, and will become easy to give a wearer sense of incongruity.

[0033] Moreover, if fiber density with long slot 2D which is portions other than connection section 2C of the surface sheet 2 and said connection section 2C of trough 2B is measured, the direction of long slot 2D to which compression molding of the fiber is carried out more will become high-density, and the direction of connection section 2C will serve as low density. Thus, when elasticity can be given to connection section 2C and Yamabe 2A is crushed by making connection section 2C low density-ization, recovery of said connection section 2C becomes easy to restore Yamabe 2A to the original configuration.

[0034] Moreover, although liquid will become easy to permeate the inside of long slot 2D with high fiber density if elimination liquid is given to the surface sheet 2, the effect which controls osmosis of said elimination liquid by said low connection section 2C of fiber density can be demonstrated. Therefore, it can prevent that elimination liquid diffuses along with the surface sheet 2 beyond the need. Moreover, it becomes easy to transmit elimination liquid to the absorption core 3 from low connection section 2C of fiber density. Therefore, elimination liquid comes to be absorbed by the absorption core 3, without diffusing the surface sheet 2, and the absorptivity of liquid can obtain the sanitary napkin 1 which horizontal leakage cannot produce easily well.

[0035] Moreover, if the fiber density of the surface sheet 2 is formed so that it may become the inclined plane of the top > connection section 2C > flank of pars-basilaris-ossis-occipitalis > Yamabe 2A of trough 2B, an effect as taken below is expectable.

[0036] If the fiber density of the crowning of Yamabe 2A is formed in the 1st so that it may become lower than the fiber density of the pars basilaris ossis occipitalis of trough 2B, admiration \*\* of the touch which a wearer senses can be raised.

[0037] Cushioning properties can be raised by forming lower than the fiber density of the crowning of Yamabe 2A in the 2nd the fiber density of the inclined plane of the flank of Yamabe 2A and 2A located in both the sides of trough 2B. Admiration \*\* of the touch which a wearer senses also at this point can be raised.

[0038] In the 3rd, if the fiber density of the pars basilaris ossis occipitalis of trough 2B is formed most highly, it is going to diffuse quickly the elimination liquid which flowed into the pars basilaris ossis occipitalis of said trough 2B to the longitudinal direction of the surface sheet 2. However, since connection section 2C and the fiber density of the inclined plane of said flank become lower than the fiber density of the pars basilaris ossis occipitalis of trough 2B relatively, it becomes difficult to diffuse the elimination liquid of said pars basilaris ossis occipitalis in the inclined plane of

connection section 2C and a flank. Thereby, since the diffusion to the longitudinal direction and the cross direction as the surface sheet 2 whole can be controlled, the leakage of elimination liquid can be prevented.

[0039] To the 4th, the portion with high fiber density of liquid rate of absorption is quicker as compared with a portion with low fiber density. That is, the elimination liquid which flowed into long slot 2D can be quickly led to an absorption core from the inclined plane of connection section 2C and a flank. Therefore, since elimination liquid can be made hard to diffuse crosswise [ of a trough / the longitudinal direction and crosswise ], the leakage from the edge of the cross direction of a napkin and a longitudinal direction can be suppressed. Furthermore, in order to absorb elimination liquid promptly from the surface sheet 2 to the absorption core 3, it does not have the liquid remainder on the surface sheet 2, and can obtain the dry feeling always carried out entirely.

[0040] In the sanitary napkin 1 using said surface sheet 2, since adjacent Yamabe 2A is connected by connection section 2C prepared in trough 2B in the meantime, the elongation to the cross direction (the direction of X) of the surface sheet 2 can be controlled. Therefore, deformation of the failure by width etc. can be made hard to crush Yamabe 2A flatly, when a wearer's body pressure joins skin contact section 1A, or to produce.

[0041] Moreover, even if the big body pressure from a wearer may join skin contact section 1A, Yamabe 2A may be crushed and deformation may arise in a wave, when said body pressure decreases by motion of a wearer's body, it acts so that Yamabe 2A may be raised with the elasticity of said connection section 2C. Moreover, as Yamabe 2A and Yamabe 2A spread crosswise (the direction of X), even when the surface sheet 2 changes into a flat condition, it is drawn by Yamabe 2A and Yamabe 2A according to the tension elastic force to the cross direction of said connection section 2C, and, therefore, becomes easy to restore to a wave from said flat condition.

[0042] Therefore, the irregularity of the surface sheet 1 follows a motion of a wearer's body, and it changes so that Yamabe 2A of the surface sheet 2 may always contact by the optimal pressure for a wearer's skin. Therefore, the horizontal leakage of elimination liquid can be prevented, and a feeling of software and a feeling of a cushion can always be maintained.

[0043] As shown in drawing 4, connection section 2C prepared in trough 2B has connected the inclined planes of Yamabe 2A of both sides, and has not connected the crownings of Yamabe 2A. Therefore, elimination \*\*\*\* elimination liquid stops easily being able to flow into long slot 2D of trough 2B of the surface sheet 2 at long slot 2D which carries out proximal crosswise exceeding Yamabe 2A. The horizontal leakage by the cross direction of elimination liquid can be prevented also from this point.

[0044] Moreover, between \*\*\*\*\* trough 2B and trough 2B, it is alike and is formed so that it may shift to the location where connection section 2C differs in a

longitudinal direction, and connection section 2C is formed crosswise by turns. Thus, by forming connection section 2C crosswise in the location which becomes alternate, stability can be given to all Yamabe 2A. Moreover, since long slot 2D surrounded by connection section 2C is alternately formed in a longitudinal direction, even if elimination liquid may be transmitted in connection section 2C and may shift to the next trough 2B, the elimination liquid comes to be held within long slot 2D, and the elimination liquid cannot shift further easily to the next trough 2B. The prevention effect of the horizontal leakage also in this point is high.

[0045] Moreover, as shown in drawing 2 and drawing 3, the rear face of long slot 2D other than connection section 2C has fixed selectively with adhesives etc. to said absorption core 3 among said trough 2Bs. This stops easily being able to produce the location gap with the absorption core 3 and the surface sheet 2.

[0046] Furthermore, in the wearing condition that skin contact side 1A is actually in contact with the skin, the sanitary napkin 1 whole curves along with a longitudinal direction (the direction of Y). In this case, said connection section 2C has opened and arranged the gap to the longitudinal direction, and, moreover, connection section 2C is lower than the portion of others [ density / fiber ]. Therefore, the portion of connection section 2C serves as a bending point, the surface sheet 2 becomes easy to curve, and the shape of a wave stops being crushed easily due to this bow.

Therefore, the adhesion of the surface sheet 2 and a wearer increases.

[0047] The manufacture method of the surface sheet of the above-mentioned sanitary napkin (absorptivity article) is explained. Drawing 5 and drawing 6 show the metal mold (shaping means) which forms a wave configuration to a surface sheet, and the perspective diagram of the many trains-like metal mold whose drawing 5 is the 1st shaping means, and drawing 6 are the perspective diagrams of the convex metal mold which is the 2nd shaping means.

[0048] As for the many trains-like metal mold 11 (1st shaping means) shown in drawing 5, two or more convex rib 11a to which it was pressing side 11A, and the graphic display +Z side was prolonged in said pressing side 11A succeeding the direction of straight side (Y), and projected in cross-section convex is mutually installed at the predetermined gap W. And Slots 11b and 11b are formed between convex rib 11a and convex rib 11a. In addition, when the width-of-face size of convex rib 11a is set to  $w_0$ , the relation with the arrangement gap W of the cross direction of said convex rib 11a is  $W > w_0$ .

[0049] As for the convex metal mold 12 (2nd shaping means) shown in drawing 6, two or more formation of the convex rib 12a to which the graphic display-Z side is pressing side 12A, and is set to said pressing side 12A from predetermined linear dimension P is carried out at the longitudinal direction. Between convex rib 12a and convex rib 12a which are located in a line in the direction of straight side (Y), it is hollow 12b which consists of predetermined linear dimension L. And it is fang furrow 12b between crosswise convex rib 12a and convex rib 12a c. And linear dimension P of said convex rib 12a is the same as the gap P of said connection section 2C.

[0050] Moreover, in what is shown in drawing 6, the relation deviated by the length of  $P/2$  by which the location of 12b is mutually equivalent to the mesial magnitude of linear dimension  $P$  of said convex rib 12a by becoming depressed formed in the 2nd train which was formed in the 1st train of the arbitration to which convex rib 12a extends in a longitudinal direction, and which becomes depressed and adjoins the location of 12b and the 1st train of said arbitration is maintained. That is, hollow 12b of a  $(n+1)$  train and a  $(n-1)$  train is located in the middle location of a certain hollow 12b and this within the  $n$ -th train of arbitration, and hollow 12b which gets mixed up in a longitudinal direction.

[0051] Two or more side-by-side installation of the train which consists of such convex rib 12a is carried out crosswise at the predetermined gap  $W$ . And if the width-of-face size of convex rib 12a is set to  $w_1$ , the relation with the gap  $W$  of said convex rib 12a cross direction is Mr. field merger of the above-mentioned many trains-like metal mold 11 with  $W > w_1$ .

[0052] In addition,  $w_1$  is  $w_0 > w_1$  about  $w_0$  and the width-of-face size of convex rib 12a in the width-of-face size of rib 11a of the above-mentioned many trains-like metal mold 11.

[0053] Said many trains-like metal mold 11 and convex metal mold 12 are forming the force plunger of a couple by two. Said many trains-like metal mold 11 is installed upward, the nonwoven fabric which forms the surface sheet 2 on it is carried, and if pressing side 12A of the convex metal mold 12 is placed upside down and it pushes from a nonwoven fabric, the surface sheet 2 shown in drawing 4 will be formed.

[0054] In this case, a nonwoven fabric is pressurized between each convex rib 11a of the many trains-like metal mold 11 (1st shaping means), and slot 12c of the convex metal mold 12 (2nd shaping means), and Yamabe 2A suitable for a  $****$  side is formed. Moreover, a nonwoven fabric is pressurized by convex rib 12a of the convex metal mold 12, and slot 11b of the many trains-like metal mold 11, and said trough 2B is formed. Moreover, in the portion equivalent to which hollow 12b of the convex metal mold 12 is, connection section 2C which serves as convex to a  $****$  side is formed in trough 2B. Since the welding pressure between metal mold is eased, as for this connection section 2C, fiber density becomes low compared with Yamabe 2A or trough 2B as mentioned above.

[0055] Moreover, about the width-of-face size of convex rib 11a of the above-mentioned many trains-like metal mold 11, in  $w_0$  and the width-of-face size of convex rib 12a, since  $w_1$  is  $w_0 > w_1$ , as it is shown in drawing 2 (A), compared with the size of the cross direction of Yamabe 2A, the size of the cross direction of trough 2B becomes narrow.

[0056] Drawing 7 is the conceptual diagram showing other manufacture methods of a surface sheet. Next, in what is shown in drawing 7, it is arranged so that the peripheral faces of two rollers can contact  $**$ . A sign 21 is a roller which has arranged the shape of surface type of said many trains-like metal mold 11 (1st shaping means) in the shape of a roll, and a sign 22 is the roller which made the

shape of surface type of said convex metal mold 12 (2nd shaping means) the shape of a roll.

[0057] A roller 21 rotates in the direction of the circumference of a graphic display anti-clock, and rotates a roller 22 in the direction of the circumference of a clock. It has the relation into which convex rib 22a of a roller 22 enters among the convex ribs 21a and 21a of a roller 21. Therefore, if a band-like nonwoven fabric (for example, nonwoven fabric of multilayer structure) is inserted from a graphic display left end between a roller 21 and a roller 22, continuation formation of the surface sheet 2 which has the wave configuration which consists of Yamabe 2A and a trough 2B, and two or more connection section 2C which consists of a predetermined gap P in said trough 2B from right one end of a roller 21 and a roller 22 can be carried out.

[0058] In addition, it is desirable to heat both the metal mold 11 and 12, and said roller 21 and roller 22 at 70 degrees C - 160 degrees C. Thereby, compared with the mere case where carry out die pressing and it is based on a chisel, the moldability of a wave and connection section 2C increases, and it becomes possible to make mold collapse hard to carry out. Or it is the preceding paragraph story which passes between metal mold 11 and 12, or said rollers 21 and rollers 22, for example, a 70 degrees C - 160 degrees C preheating roller may be passed for a nonwoven fabric, or the preheat treatment of spraying a hot air etc. may be carried out.

[0059] Furthermore, if for example, cold air is sprayed after application-of-pressure hot forming, distortion of the configuration at the time of conveyance can be suppressed fewer.

[0060] In the manufacturing process of a sanitary napkin 1, the absorption core 3 is supplied on the rear-face sheet 4, and said surface sheet 2 formed as mentioned above piles up on the rear-face sheet 4 located in the absorption core 3 top and the periphery of the absorption core 3. At this time, hot melt adhesive is selectively applied to the \*\*\* side front face of the absorption core 3, and hot melt adhesive is applied also to said rear-face sheet 4. The layered product of the rear-face sheet 4 of the cross-section structure shown in drawing 2 by adhesion of this hot melt adhesive, the absorption core 3, and the surface sheet 2 is formed.

[0061] In addition, said layered product is further compressed in the state of heating between application-of-pressure rollers, and application-of-pressure section 3a of the violin configuration shown in drawing 1 is formed.

[0062]

[Example] The sanitary napkin which consists of a surface sheet (A) which equipped the wave configuration with connection section 2C, and the sanitary napkin which consists of a surface sheet (B) which consists only of a wave configuration are made as an experiment, and since the assessment trial was performed, it explains below.

[0063] (Specification of a surface sheet) PE (polyethylene) / PET (polyethylene

terephthalate) fiber of a 2.5 denier x51mm sheath-core mold were made to sheetize by the air through method, and the nonwoven fabric with 30g of superintendent officers/, m2, a CD reinforcement [ of 190g/inch ], and a thickness of 0.5mm was made as an experiment, and it considered as the compound sheet on which three sheets of these sheets were put.

[0064] The many trains-like metal mold 11 (refer to drawing 5 ) with a height  $h_1=5\text{mm}$  [ of convex rib 11a ], and a crosswise gap of  $W=5\text{mm}$ , (Specification of the surface sheet (A) which equipped the wave configuration with the connection section) By heating respectively the convex metal mold 12 (referring to drawing 6 ) with a size [ of height  $h_2=3.5\text{mm}$  and hollow 12b / of  $L=2\text{mm}$  ], and a length [ of convex rib 12a ] of  $P=2.5\text{mm}$  at 80 degrees C and 90 degrees C, and carrying out application-of-pressure heating for 1 second under compression of 50kgf The surface sheet which equipped the wave configuration with connection section 2C was formed.

[0065] (Specification of the surface sheet (B) which consists only of a wave configuration) The surface sheet which consists only of a wave configuration was formed by preparing the two same many trains-like metal mold (height  $h_1=5\text{mm}$ , crosswise gap size of  $W=5\text{mm}$ ) 11 as the above, and pressurizing the above-mentioned compound sheet by two sets of said many trains-like metal mold from the upper and lower sides.

[0066] (1) Each surface sheet of the assessment test (specification of sample) above (A) of configuration recoverability and (B) was respectively cut into 50mmx50mm magnitude, and what was carried, respectively on the absorptivity core 3 which blended SAP30g/m2 to the basis weight of 120g/the wood pulp of m2, and carried out the common press at the thickness of 2mm was made into the sample of a sanitary napkin.

[0067] (Assessment test method of configuration recoverability)

\*\* From on the surface sheet 2 of each sample, make a 7ml liquid (artificial menstrual blood) dropped by the flow rate of 7 ml/min, and leave it for 30 seconds.

\*\* Give 50g /of loads of 2 after neglect to each prototype piece for 5 minutes cm, and investigate height H of Yamabe 2A when opening a load, and the height  $H_0$  before load grant.

\*\* It is referred to as configuration recovery-factor  $= (\text{height [ after load grant ] } H) / (\text{height } H_0 \text{ before load grant}) \times 100$ , and evaluate by comparing the surface sheet (B) which consists only of a surface sheet (A) which equipped the wave configuration with the connection section, and a wave configuration.

[0068] (Result of an assessment trial of configuration recoverability)

A: configuration recovery-factor [ of the surface sheet which equipped the wave configuration with the connection section ] = — configuration recovery-factor [ of the surface sheet which consists only of a 60%B:wave configuration ] = — although it was the almost same sample as the object for the assessment trial of the 40% compression [ (2) ] recovery assessment test (specification of sample) above—

mentioned configuration recoverability, magnitude of each surface sheet of (A) and (B) was set to each 50mmx100mm.

[0069] (The method of a compression recovery assessment trial)

**\*\* Make each sample absorb 7ml artificial menstrual blood.**

**\*\* Add the load of 3g/m<sup>2</sup> to each sample, and measure the thickness under this load (a).**

**\*\* Next, add the load of 47 g/m<sup>2</sup> to each sample, and leave it for 10 minutes.**

**\*\* Return to the load of 3 g/m<sup>2</sup> after neglect, leave it for 3 minutes, and measure the thickness (b) of each sample.**

**\*\* Ask for the compression recovery factor of each sample as compression recovery-factor (%) =  $b/a \times 100$ .**

[0070] (Result of a compression recovery assessment trial)

A: More than compression recovery-factor =55%B of the surface sheet which equipped the wave configuration with the connection section : the result of the assessment trial of the surface sheet which consists only of a wave configuration beyond less than [ compression recovery-factor =50% ] shows excelling the surface sheet (B) with which the direction of the surface sheet (A) with which the configuration recovery factor and the compression recovery factor equipped the wave configuration with the connection section consists only of a wave configuration.

[0071] In addition, it is possible to adjust a configuration recovery factor and a compression recovery factor for the number of the connection sections of the connection section by increase and decrease of \*\*\*\*\* with the surface sheet which equipped the wave configuration with the connection section.

[0072]

[Effect of the Invention] According to this invention explained in full detail above, the surface sheet of the absorptivity article excellent in a feeling of software and cushioning properties can be obtained. Moreover, if the body pressure which acts on a surface sheet is made to open, an early feeling of software and cushioning properties before receiving body pressure can be regained.

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[Translation done.]

**\* NOTICES \***

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] The plan showing a sanitary napkin from a \*\*\*\* side as a gestalt of operation of the absorptivity article in this invention,

[Drawing 2] The cross section of the direction of X of drawing 1 is shown, for (A), it is an IIA-IIA line cross section, and (B) is an IIB-IIB line cross section,

[Drawing 3] The cross section of the direction of Y of drawing 1 is shown, for (A), it is an IIIA-IIIA line cross section, and (B) is an IIIB-IIIB line cross section,

[Drawing 4] The partial perspective diagram of a surface sheet,

[Drawing 5] The perspective diagram of the many trains-like metal mold which forms a wave configuration in a surface sheet,

[Drawing 6] The perspective diagram of the convex metal mold which forms a wave configuration in a surface sheet,

[Drawing 7] The schematic diagram of other manufacture methods of a surface sheet,

### [Description of Notations]

#### 1 Sanitary Napkin (Absorptivity Article)

1A Skin contact section

2 Surface Sheet

2A Wave-like Yamabe

2B A wave-like trough

2C Connection section

2D Long slot

#### 3 Absorption Core (Absorption Layer)

4 Rear-Face Sheet

#### 11 Many Trains-like Metal Mold (1st Shaping Means)

11a Convex rib

11b Slot

#### 12 Convex Metal Mold (2nd Shaping Means)

12a Convex rib

12b Hollow

12c Slot

#### 21 Roller (1st Shaping Means)

#### 22 Roller (2nd Shaping Means)

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[Translation done.]

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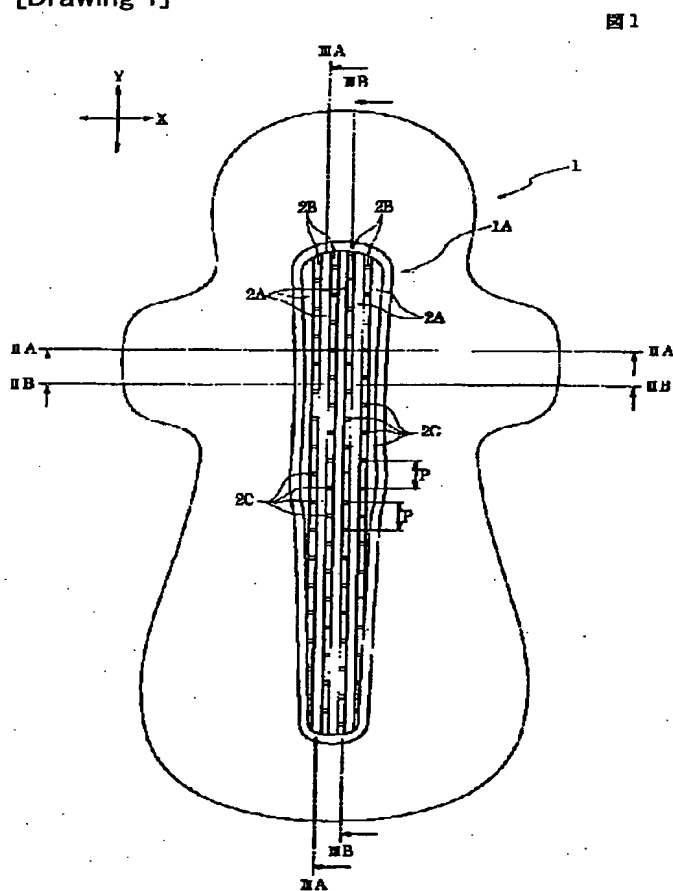
3. In the drawings, any words are not translated.

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## DRAWINGS

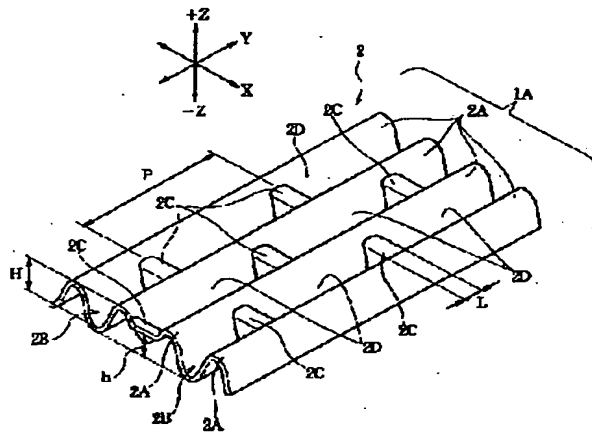
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[Drawing 1]



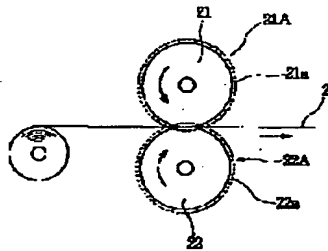
[Drawing 4]

図 4



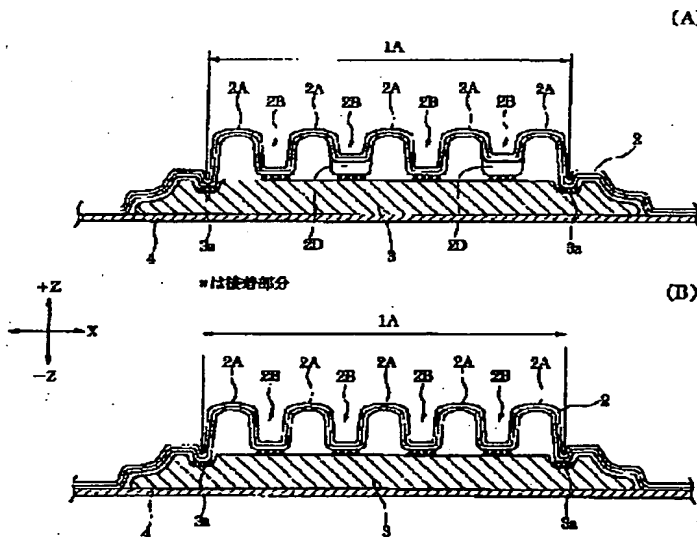
[Drawing 7]

図 7

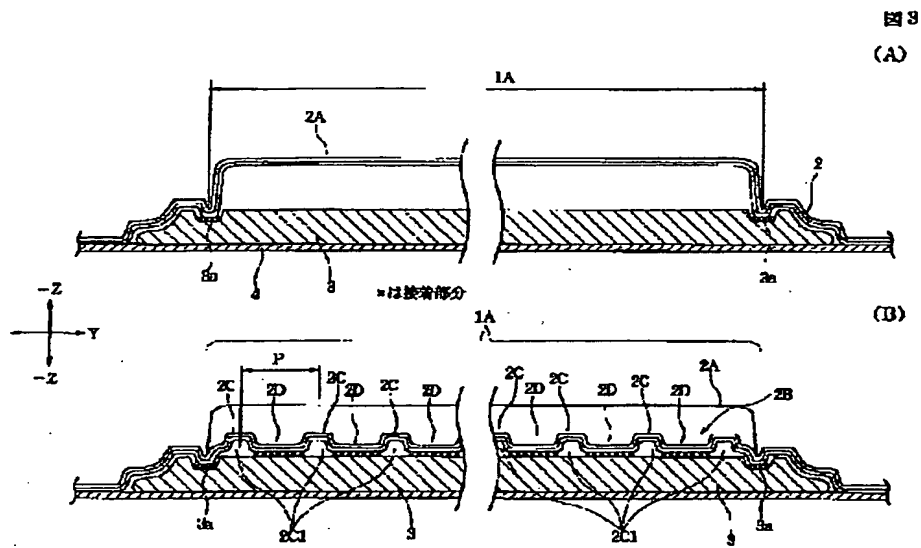


[Drawing 2]

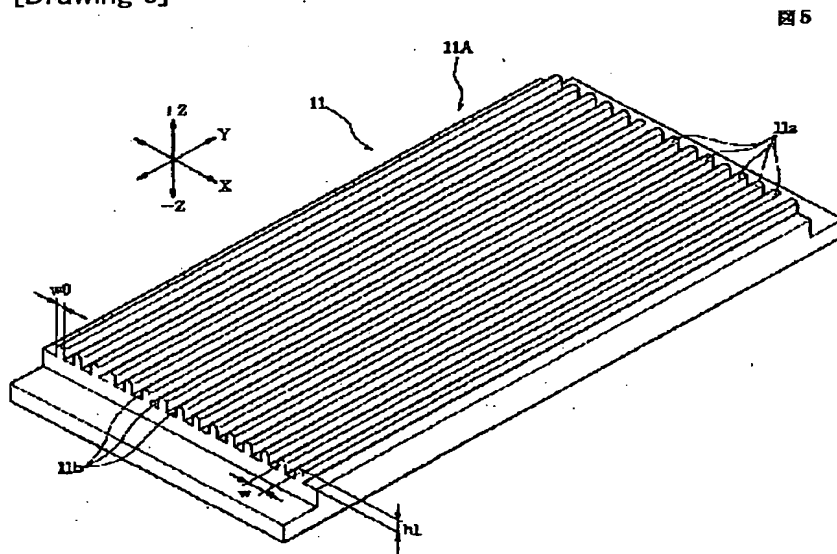
図 2



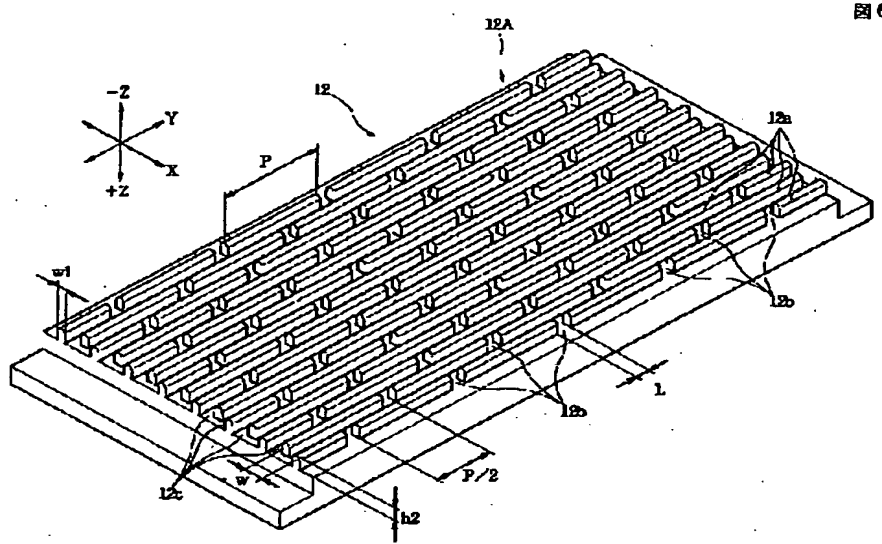
[Drawing 3]



[Drawing 5]



[Drawing 6]



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(71) 出願人 000115108

ユニ・チャーム株式会社

愛媛県川之江市金生町下分182番地

(72) 発明者 水谷 聡

香川県三豊郡豊浜町和田浜高須賀1531-7

ユニ・チャーム株式会社テクニカルセン  
ター内

(72) 発明者 田上 悦子

香川県三豊郡豊浜町和田浜高須賀1531-7

ユニ・チャーム株式会社テクニカルセン  
ター内

(74) 代理人 100085453

弁理士 野▲崎▼ 照夫

最終頁に続く

(54) 【発明の名称】 吸収性物品およびその製造方法

(57) 【要約】

【課題】 従来の表面シートは、単に不織布を波形形状としたものに過ぎなかったため、体圧を受けると変形しやすく、また体圧から開放されても元の初期形状に回復し難いものであったため、ソフト感やクッション性が低いものであった。

【解決手段】 不織布を波形形状とし、前記波形形状の谷部2B内に、その両サイドの山部2Aどうしを連結する連結部2Cを複数設ける。これにより、山部2Aどうしが連結部2Cの弾性を介して連結されるため、山部2Aの変形量を最小なものにできる。また体圧が開放されたときにも、前記連結部2Cの弾性により、元の形状に復帰しやすくなる。よって、ソフト感とクッション性に優れた表面シート2とすることができる。

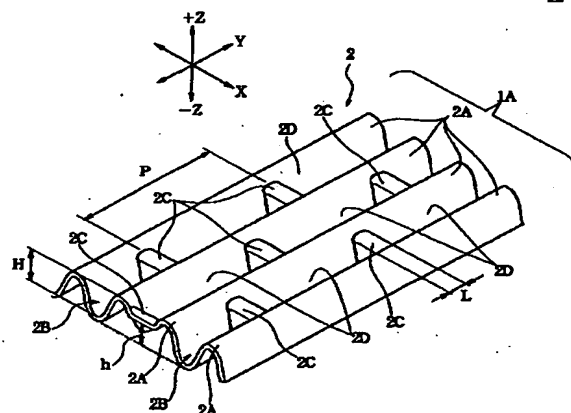


図4

## 【特許請求の範囲】

【請求項1】 吸収層の受液側に、体内から排出された排泄液を前記吸収層に導く液透過性の表面シートが設置されている吸収性物品において、前記表面シートには、受液側に向く谷部と山部とが、長手方向に延び且つ前記長手方向と直交する幅方向へ波状に形成されており、前記谷部には、この谷部の両側に位置する山部と山部とを連結する連結部が受液側に向けて凸状に形成されていることを特徴とする吸収性物品。

【請求項2】 前記連結部は、2つの山部の側部の傾斜面どうしを連結するものである請求項1記載の吸収性物品。

【請求項3】 前記連結部が、前記谷部に沿って長手方向へ一定の間隔で形成されている請求項1又は2記載の吸収性物品。

【請求項4】 前記連結部の長手方向の間隔が、5mm以上30mm以下である請求項3記載の吸収性物品。

【請求項5】 前記谷部に形成されている前記凸部は、隣り合う谷部間において前記長手方向へ位置をずらして形成されている請求項1ないし4のいずれかに記載の吸収性物品。

【請求項6】 前記連結部の頂部の前記幅方向の長さが、1mm以上10mm以下である請求項1ないし5のいずれかに記載の吸収性物品。

【請求項7】 前記谷部の底部から山部の頂部までの高さ寸法(H)を100%としたときに、前記谷部の底部から前記連結部の頂部までの高さ寸法(h)が20%~80%の範囲で形成されている請求項1ないし6のいずれかに記載の吸収性物品。

【請求項8】 前記連結部での表面シートの繊維密度が、前記連結部以外の谷部の繊維密度よりも低密度である請求項1ないし7のいずれかに記載の吸収性物品。

【請求項9】 前記表面シートの各部における繊維密度の関係が、谷部の底部>山部の頂部である請求項1ないし7のいずれかに記載の吸収性物品。

【請求項10】 前記表面シートの各部における繊維密度の関係が、山部の頂部>山部の側部である請求項1ないし9のいずれかに記載の吸収性物品。

【請求項11】 前記表面シートの各部における繊維密度の関係が、山部の頂部>連結部≧山部の側部である請求項9または10記載の吸収性物品。

【請求項12】 前記表面シートの底部の裏面が前記吸収層に固着されている請求項1ないし11のいずれかに記載の吸収性物品。

【請求項13】 前記表面シートは、疎水性繊維を含む不織布が複数枚積層されたものである請求項1ないし12のいずれかに記載の吸収性物品。

【請求項14】 (a)一定方向へ供給する不織布を第1の成形手段と第2の成形手段とで挟んで表面シートを形成する工程と、

(b)前記工程で成形された表面シートを吸収層の受液側に設置する工程とを有し、

前記第1の成形手段は、不織布の供給方向に沿って延び且つ前記供給方向と直交する幅方向に交互に形成された凸状リブと溝とを有し、

前記第2の成形手段は、前記供給方向に延び前記幅方向に交互に形成された凸状リブと溝とを有し、前記凸状リブには、前記供給方向に間隔を開けて複数の窪みが形成されており、

前記(a)の工程で形成される表面シートは、第1の成形手段の凸状リブと第2の成形手段の溝との間で加圧された山部と、第1の成形手段の溝と第2の成形手段の凸状リブとの間で加圧された谷部と、前記第2の成形手段の窪みに相当する部分で前記谷部に於て両側の山部の間を連結するように形成された凸状の連結部とを形成し、前記(b)の工程では、前記表面シートの山部と谷部が受液側に向けられるように前記吸収層の表面に固着することを特徴とする吸収性物品の製造方法。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、生理用ナプキン、バンティ―ライナー、失禁パッドなどの吸収性物品に係わり、特にソフト感とクッション性に優れ且つ保形性に優れた表面シートを備えた吸収性物品およびその製造方法に関する。

【0002】

【従来の技術】吸収層の受液側に液透過性の表面シートを備えた吸収性物品は、例えば特表平10-502000号公報などに開示されている。

【0003】前記特表平10-502000号公報に記載された衛生ナプキンでは、支持層7の上に波形10を有するカバー層9が設けられ、この波形より体液の漏れ防止を図ることができ、また波形の可撓性により着用快適性を増進するというものである。

【0004】

【発明が解決しようとする課題】しかし、同公報に記載された衛生ナプキンでは、波形10を有するカバー層9が肌に接触したときに、着用者の体圧により波形10が偏平に変形しやすく、または波形10に横倒れを生じやすい。また、装着時に体圧が変化し波形10に作用する加圧力が低下したときに、偏平状態や横倒れの状態からカバー層9が元の波形10の形状に復元しにくい。その結果、カバー層9が着用者の肌へ常に最適な状態で密着できず、排泄液が吸収性物品内で必要以上に広がって横漏れを生じたり、また肌に対するソフト感やクッション性が低下する問題がある。

【0005】本発明は上記従来の課題を解決するためのものであり、体圧が変化したときでも表面シートの波形が常に同じ状態に保持でき、着用者の肌への密着性が低

下せず、ソフト感とクッション性を常に維持できる吸収性物品およびその製造方法を提供することを目的としている。

#### 【0006】

【課題を解決するための手段】本発明は、吸収層の受液側に、体内から排出された排泄液を前記吸収層に導く液透過性の表面シートが設置されている吸収性物品において、前記表面シートには、受液側に向く谷部と山部とが、長手方向に延び且つ前記長手方向と直交する幅方向へ波状に形成されており、前記谷部には、この谷部の両側に位置する山部と山部とを連結する連結部が受液側に向けて凸状に形成されていることを特徴とするものである。

【0007】本発明の吸収性物品では、表面シートの山部間を繋ぐ連結部が設けられているため、体圧により山部が偏平となったりまたは横倒れが生じ難くすることができる。また仮に偏平または横倒れなどが生じて、前記体圧が低下したときに、連結部が弾性的に作用するため山部が元の状態に復元しやすい。よって着用者の体の動きにより表面シートと肌との密着状態が変化した場合でも、前記表面シートの山部が体の動きに追従して偏平しそして復元できるようになり、肌への密着性を常に高い状態に維持できる。よって排泄液が表面シートの表面で広がりにくく、横漏れを有効に防止できる。また着用者に与えるソフト感やクッション感が低下しない。

【0008】例えば、前記連結部は、2つの山部の側部の傾斜面どうしを連結するものである。連結部が傾斜面どうしを連結するように一体に形成されていると、山部に圧力が作用しその圧力が低下したときに傾斜面が立ち上がって山部が復元しやすくなる。

【0009】また、前記連結部が、前記谷部に沿って長手方向へ一定の間隔で形成されていることが好ましい。この場合、前記連結部の長手方向の間隔が、5mm以上30mm以下であることが好ましい。

【0010】このように谷部において連結部が一定の間隔で配列していると、表面シートの全域において波形状の復元性がよくなる。また、前記谷部に形成されている前記凸部は、隣り合う谷部間において前記長手方向へ位置をずらして形成されていることが好ましい。

【0011】このように、連結部が位置をずらして形成されていると、複数の山部のそれぞれが連結部により復元しやすくなる。また排泄液の横方向への拡散も防止しやすくなる。また、前記連結部の頂部の前記幅方向の長さが、1mm以上10mm以下であることが好ましい。

【0012】さらに、前記谷部の底部から山部の頂部までの高さ寸法(H)を100%としたときに、前記谷部の底部から前記連結部の頂部までの高さ寸法(h)が20%~80%の範囲で形成されているのが好ましい。前記範囲未満であると、連結部による波形状の復元機能が低下する。また前記範囲を超えると、連結部が肌に当

たりやすくなって、肌への装着感が悪くなる。

【0013】さらに、前記連結部での表面シートの繊維密度が、前記連結部以外の谷部の繊維密度よりも低密度であることが好ましい。このように連結部を低密度にしておくと、排泄液が谷部に沿って広がろうとしたときに、前記低密度の連結部が排泄液の拡散を防止する機能を発揮できる。またこの低密度の部分では、排泄液を急速に透過して吸収層に与えることができるようになる。

【0014】また、前記表面シートの各部における繊維密度の関係が、谷部の底部>山部の頂部であることが好ましく、また山部の頂部>山部の側部であることが好ましく、さらには、山部の頂部>連結部>山部の側部であることが好ましい。そして最も好ましくは前記表面シートの各部における繊維密度の関係が、谷部の底部>山部の頂部>連結部>山部の側部の傾斜面である。

【0015】これにより、表面シートの肌触り感およびクッション性を高めることができる。さらに排泄液が谷部の長手方向および幅方向に拡散しにくくできるため、ナプキンの幅方向および長手方向の縁部からの漏れを抑えることができる。よって、排泄液が、表面シートから吸収コアへ迅速に吸収されるようになるため、表面シート上での液残りがなく、常にサラッとしたドライ感を得ることができる。

【0016】また、前記表面シートの底部の裏面が前記吸収層に固着されていることが好ましい。表面シートの底部が吸収層に固着されていると、表面シートと吸収層との位置ずれが生じにくくなる。

【0017】前記表面シートは、疎水性繊維を含む不織布が複数枚積層されたものであることが好ましい。例えばエアスルー不織布などの高高度の不織布を複数枚重ねて表面シートを形成すると、表面シートのソフト感とクッション性を高めることができる。

【0018】また本発明の吸収性物品の製造方法は、

(a) 一定方向へ供給する不織布を第1の成形手段と第2の成形手段とで挟んで表面シートを形成する工程と、

(b) 前記工程で成形された表面シートを吸収層の受液側に設置する工程とを有し、前記第1の成形手段は、不織布の供給方向に沿って延び且つ前記供給方向と直交する幅方向に交互に形成された凸状リブと溝とを有し、前記第2の成形手段は、前記供給方向に延び前記幅方向に交互に形成された凸状リブと溝とを有し、前記凸状リブには、前記供給方向に間隔を開けて複数の窪みが形成されており、前記(a)の工程で形成される表面シートは、第1の成形手段の凸状リブと第2の成形手段の溝との間で加圧された山部と、第1の成形手段の溝と第2の成形手段の凸状リブとの間で加圧された谷部と、前記第2の成形手段の窪みに相当する部分で前記谷部に於て両側の山部の間を連結するように形成された凸状の連結部とを形成し、前記(b)の工程では、前記表面シートの山

部と谷部が受液側に向けられるように前記吸収層の表面に固着する、ことを特徴とするものである。

【0019】

【発明の実施の形態】以下、本発明について図面を参照して説明する。図1は本発明における吸収性物品の実施の形態として生理用ナプキンを受液側から示す平面図、図2は図1のX方向の断面を示し、(A)はIIA-IIA線断面図、(B)はIIB-IIB線断面図、図3は図1のY方向の断面を示し、(A)はIIIA-IIIA線断面図、(B)はIIIB-IIIB線断面図、図4は生理用ナプキンの表面シート(肌当接面)のみを示す部分斜視図である。

【0020】図2に示すように、生理用ナプキン(吸収性物品)1は、主に液透過性の表面シート(表面構造体)2、経血、尿などの排泄液を吸収する吸収コア(吸収層)3、および液不透透性の裏面シート4の3層から構成されている。前記表面シート2は肌に直接接触するものであり、人の体内から排出される経血などの体液を透液させ、その下層に設けられた吸収層3に導くものである。

【0021】前記表面シート2は、例えば高高で空隙性の高いエアスルー不織布、ポイントボンド不織布、スパンボンド不織布、スパンレース不織布、メルトブロン不織布等からなる。なお、特性的には高高でクッション性に優れたエアスルー不織布が最も好ましい。

【0022】前記不織布に使用される繊維としては、例えばPE(ポリエチレン)、PP(ポリプロピレン)、PET(ポリエチレンテレフタレート)、PE/PP、PE/PETのような芯鞘型繊維、若しくはサイドバイサイド型繊維などの疎水性の合成繊維を主体とする。さらに、レーヨン等の再生セルロース繊維などの親水性繊維を含んでもよい。

【0023】また繊維の紡糸時にドラフト率を下げて伸縮度を高めることにより、繊維自体を柔らかく仕上げてよい。この時、繊維をカーディングする際のウェーブ強度を維持できるように乾燥時の伸度(最大引張り歪み)を120%以下に仕上げるのが好ましい。なお、伸度が120%を越えると、ウェーブ強度が不足し、シート化が困難となる。なお、より好ましい伸度は、60%~100%の範囲であり、この範囲であれば適正なウェーブ強度を維持できるとともに繊維の滑らかさのバランスを取ることができる。

【0024】さらに繊維デニールが、1デニール以下であると毛管作用により液残りを生じ易く、また6デニール以上であると硬いざらつき感を生じることがあるため、繊維デニールは1~6デニールであるものが好ましい。

【0025】前記表面シート2の目付けは、成形のしやすさ及び液残りの生じ難さの観点から20g/m<sup>2</sup>~120g/m<sup>2</sup>の範囲が好ましい。

【0026】前記表面シート2は、単層構造の不織布であってもよいし、図2および図3に示されるように2枚以上の前記単層構造の不織布を重ねた複合シートで構成されていてもよい。前記単層構造の不織布の目付けは、85g/m<sup>2</sup>が最適である。

【0027】また前記表面シート2が、例えば3層の複合シートである場合には、3層のうちの1層の不織布として、2.5デニール×51mmの芯鞘型のPE/PET繊維をエアスルー方式でシート化させた目付け30g/m<sup>2</sup>、CD強度190g/inch、厚さ約0.5mmが挙げられる。この場合、肌に接触する第1層が繊維の張りの少ない中空構造の芯鞘繊維などのように肌触り感を向上させるものが好ましく、第2、第3層は例えば中空構造の芯鞘繊維などのように高高を稼いでソフト感を高めることができるものが好ましい。また前記第1層の肌当接面(表面)は、酸化チタンの量を増量することにより、いわゆる繊維のコシを軽減して肌触りを向上させたものが好ましい。より具体的には、第2、第3層および第1層の非肌当接面(裏面)における芯鞘構造の線の芯部材に含有される酸化チタンの量が0.5%であるのに対し、第1層の肌当接面に含有される酸化チタンの量は4%としたものである。

【0028】図1に示すように、生理用ナプキン1の表面シート2の中央には、略バイオリン形状に起伏した肌当接部1Aが形成されている。図2(A)、(B)に示すように、裏面シート4の上層側に設けられた吸収コア3の外周と表面シート2とが加圧部3aにおいて加圧されると共に、この加圧部3aにおいて吸収コア3と表面シート2とが、ホルトメルト型の接着剤による接着や、または熱溶着などの手段により固定されている。そして、前記加圧部3aで囲まれた部分の内側が実質的な肌当接部1Aとなっている。

【0029】図1、図2(A)、(B)、図3(A)、(B)および図4に示すように、前記肌当接部1Aは、長手方向(図示Y方向)に延びる複数の山部2Aと谷部2Bとが形成され、これら山部2Aと谷部2Bは幅方向(図示X方向)に交互に波形形状に形成されている。図3(B)及び図4に示すように、前記谷部2Bには、谷部2Bの底部から表面シート2の表面側である肌当接面方向(+Z方向)に凸状に隆起する連結部2Cが形成されている。前記連結部2Cは、前記幅方向に延び且つ谷部2Bの両サイドに位置する山部2A、2Aの側部の傾斜面どうしを繋ぐように形成されている。そして、1つの谷部2B内には複数の連結部2Cが形成されている。

【0030】これら複数の連結部2Cは、長手方向に一定の間隔Pに形成され、連結部2Cと連結部2Cとの間が長溝2Dとなっている。前記連結部2Cの頂部の幅方向の長さは、1mm~10mmの範囲であり、より好ましくは2mm~6mmの範囲である。なお、前記連結部2Cの幅方向の長さが、1mm以下であると波形形状の

回復に寄与しにくくなり、また10mm以上であると波形によるソフト感が減殺され、剛直感が高まって硬い折れ皺を生じることがあるため適切ではない。

【0031】また前記間隔P（長溝2Dの長さ）は、5mm～30mmの範囲が適切であり、より好ましくは5mm～20mmの範囲である。これは間隔Pが30mm以上であると、山部2Aと谷部2Bとによる波形形状が回復性が低下しやすく、5mm以下であると剛直感が高まって硬い折れ皺を生じ、波形によるソフト感が損なわれやすくなるからである。

【0032】さらに図4に示すように、谷部2Bの底部からの連結部2Cの頂部までの高さhは、前記山部2Aの頂部と谷部2Bの底部と高さH（Z方向の高さ）を100%としたときに、20%～80%の範囲で形成されているものが好ましい。連結部2Cの高さが前記範囲未満であると、波形の回復に寄与しにくくなり、前記範囲を超えると、連結部2Cが肌に当たりやすくなり、着用者に違和感を与えやすくなる。

【0033】また表面シート2の連結部2Cと、谷部2Bの前記連結部2C以外の部分である長溝2Dとの繊維密度を比較すると、繊維がより圧縮成形される長溝2Dの方が高密度となり、連結部2Cの方が低密度となる。このように連結部2Cを低密度化にすることによって、連結部2Cに弾性を持たせることができ山部2Aが潰れたときに、前記連結部2Cの回復により山部2Aを元の形状に復元しやすくなる。

【0034】また排泄液が表面シート2に与えられると繊維密度の高い長溝2D内を液が浸透しやすくなるが、繊維密度の低い前記連結部2Cで前記排泄液の浸透を抑制する効果を発揮できる。よって排泄液が表面シート2に沿って必要以上に拡散するのを防止できる。また排泄液は繊維密度の低い連結部2Cから吸収コア3へ伝達しやすくなる。よって排泄液は表面シート2を拡散せずに吸収コア3に吸収されるようになり、液の吸収性が良く横漏れの生じにくい生理用ナプキン1を得ることができる。

【0035】また、表面シート2の繊維密度を、谷部2Bの底部>山部2Aの頂部>連結部2C≧側部の傾斜面となるように形成すると、以下に示すような効果が期待できる。

【0036】第1に、山部2Aの頂部の繊維密度を谷部2Bの底部の繊維密度よりも低く形成すると、着用者が感じる肌触りの感度を向上させることができる。

【0037】第2に、谷部2Bの両サイドに位置する山部2A、2Aの側部の傾斜面の繊維密度を山部2Aの頂部の繊維密度よりも低く形成することにより、クッション性を高めることができる。この点でも着用者が感じる肌触りの感度を高めることができる。

【0038】第3には、谷部2Bの底部の繊維密度を最

も高く形成しておく、前記谷部2Bの底部に流入した排泄液は、表面シート2の長手方向へ素早く拡散しようとする。しかし、連結部2Cおよび前記側部の傾斜面の繊維密度は、相対的に谷部2Bの底部の繊維密度よりも低くなるため、前記底部の排泄液は連結部2Cおよび側部の傾斜面で拡散することは困難となる。これにより、表面シート2全体としての長手方向および幅方向への拡散が抑制できるようになるため、排泄液の漏れを防止できる。

10 【0039】第4に、液吸収速度は、繊維密度が低い部分に比較して繊維密度が高い部分の方が速い。すなわち、長溝2Dに流入した排泄液を連結部2Cおよび側部の傾斜面から素早く吸収コアに導くことができる。よって、排泄液が谷部の長手方向および幅方向に拡散しにくくできるので、ナプキンの幅方向および長手方向の縁部からの漏れを抑えることができる。さらに排泄液は、表面シート2から吸収コア3へ迅速に吸収されるようになるため、表面シート2上での液残りがなく、常にサラッとしたドライ感を得ることができる。

20 【0040】前記表面シート2を用いた生理用ナプキン1では、隣り合う山部2Aどうしが、その間の谷部2Bに設けられた連結部2Cで連結されているため、表面シート2の幅方向（X方向）への伸びを抑制することができる。よって、肌当接部1Aに着用者の体圧が加わるることによって山部2Aが偏平に潰れたりまたは横倒れなどの変形を生じ難くすることができる。

30 【0041】また仮に肌当接部1Aに着用者からの大きな体圧が加わって、山部2Aが潰れて波形に変形が生じることがあっても、着用者の体の動きにより前記体圧が減少したときに、前記連結部2Cの弾性により山部2Aが持ち上げられるように作用する。また山部2Aと山部2Aとが幅方向（X方向）へ広がる様にして表面シート2が偏平状態になった場合でも、前記連結部2Cの幅方向への引張り弾性力により山部2Aと山部2Aとが引き付けられ、よって前記偏平状態から波形に復元しやすくなる。

40 【0042】したがって、着用者の体の動きに表面シート1の凹凸が追従し、常に表面シート2の山部2Aが着用者の肌に最適な圧力で当接するように成る。よって排泄液の横漏れを防止でき、また常にソフト感とクッション感を維持できる。

【0043】図4に示すように、谷部2B内に設けられる連結部2Cは、両側の山部2Aの傾斜面どうしを連結しており、山部2Aの頂部どうしを連結していない。よって、表面シート2の谷部2Bの長溝2Dに排泄された排泄液は、山部2Aを越えて幅方向に隣設する長溝2Dに流れ込みにくくなる。この点からも排泄液の幅方向への横漏れを防止することができる。

50 【0044】また隣合う谷部2Bと谷部2Bとの間では、連結部2Cが長手方向に異なる位置にずれるように

て形成されており、連結部2Cは、幅方向に交互に形成されている。このように連結部2Cが幅方向へ互い違いとなる位置に形成されていることにより、全ての山部2Aに対して復元力を与えることができる。また連結部2Cで囲まれる長溝2Dが横方向へ互い違いに形成されるため、排泄液が連結部2Cを伝わって隣りの谷部2Bに移行することがあっても、その排泄液は長溝2D内で保持されるようになり、その排泄液がさらに隣りの谷部2Bまで移行しにくい。この点でも横漏れの防止効果が高い。

【0045】また図2および図3に示すように、前記谷部2Bのうち連結部2C以外の長溝2Dの裏面が、前記吸収コア3に対し接着剤等により部分的に固着されている。これにより、吸収コア3と表面シート2との位置ずれが生じにくくなる。

【0046】さらに、肌当接面1Aが実際に肌に当接している装着状態では、長手方向(Y方向)に沿って生理用ナプキン1全体が湾曲する。この場合に、前記連結部2Cが長手方向へ間隔を開けて配列しており、しかも連結部2Cは繊維密度が他の部分よりも低くなっている。よって連結部2Cの部分が曲げ点となって、表面シート2が湾曲しやすくなり、この湾曲によって波形状が潰れにくくなる。よって表面シート2と着用者との密着性が高まる。

【0047】上記生理用ナプキン(吸収性物品)の表面シートの製造方法について説明する。図5及び図6は表面シートに波形状を形成する金型(成形手段)を示し、図5は第1の成形手段である多列状金型の斜視図、図6は第2の成形手段である凸状金型の斜視図である。

【0048】図5に示す多列状金型11(第1の成形手段)は、図示+Z側が押当11Aであり、前記押当11Aには、長手(Y)方向に連続して延び且つ断面凸状に突出した複数の凸状リブ11aが互いに所定の間隔Wで並設されている。そして凸状リブ11aと凸状リブ11aとの間に溝11b、11bが形成されている。なお、凸状リブ11aの幅寸法をw0とすると、前記凸状リブ11aの幅方向の配置間隔Wとの関係は、 $W > w0$ である。

【0049】図6に示す凸状金型12(第2の成形手段)は、図示-Z側が押当12Aであり、前記押当12Aには、所定の長さ寸法Pからなる凸状リブ12aが長手方向に複数形成されている。長手(Y)方向に並ぶ凸状リブ12aと凸状リブ12aとの間は、所定の長さ寸法Lからなる窪み12bとなっている。そして幅方向の凸状リブ12aと凸状リブ12aとの間に溝12cである。そして、前記凸状リブ12aの長さ寸法Pは前記連結部2Cの間隔Pと同じである。

【0050】また図6に示すものでは、凸状リブ12aが長手方向に延びる任意の第1列に形成された窪み12bの位置と、前記任意の第1列に隣接する第2列に形成

された窪み12bの位置とは、互いに前記凸状リブ12aの長さ寸法Pの半値に相当するP/2の長さ分だけずれた関係が維持されている。すなわち、任意の第n列のある窪み12bとこれと長手方向に前後する窪み12bとの中間の位置に、第(n+1)列および第(n-1)列の窪み12bが位置するものとなっている。

【0051】このような凸状リブ12aからなる列が幅方向に所定の間隔Wで複数並設されている。そして、上記多列状金型11の場合と同様に、凸状リブ12aの幅寸法をw1とすると、前記凸状リブ12a幅方向の間隔Wとの関係は、 $W > w1$ となっている。

【0052】なお、上記多列状金型11のリブ11aの幅寸法をw0と、凸状リブ12aの幅寸法をw1とは、 $w0 > w1$ である。

【0053】前記多列状金型11と凸状金型12とは、二つで一对の押型をなしている。前記多列状金型11を上向きに設置し、その上に表面シート2を形成する不織布を載せ、凸状金型12の押当12Aを下向きにして不織布の上から押し付けると、図4に示す表面シート2が形成される。

【0054】この場合、多列状金型11(第1の成形手段)の各凸状リブ11aと、凸状金型12(第2の成形手段)の溝12cとの間で不織布が加圧されて、受液側に向く山部2Aが形成される。また、凸状金型12の凸状リブ12aと、多列状金型11の溝11bとで不織布が加圧されて前記谷部2Bが形成される。また凸状金型12の窪み12bが当たる部分では、谷部2B内に受液側へ凸状となる連結部2Cが形成される。この連結部2Cは金型間の加圧力が緩和されるため、前記のように繊維密度が山部2Aや谷部2Bに比べて低くなる。

【0055】また上記多列状金型11の凸状リブ11aの幅寸法をw0と、凸状リブ12aの幅寸法をw1とは、 $w0 > w1$ であるため、図2(A)に示すように、山部2Aの幅方向の寸法に比べて、谷部2Bの幅方向の寸法が狭くなる。

【0056】図7は、表面シートの他の製造方法を示す概念図である。次に、図7に示すものでは、2つのローラの外周面どうしが互に当接できるように配置されている。符号21は、前記多列状金型11(第1の成形手段)の表面形状をロール状に配置したローラであり、符号22は前記凸状金型12(第2の成形手段)の表面形状をロール状にしたローラである。

【0057】ローラ21が図示反時計回り方向に回転し、ローラ22は時計回り方向に回転する。ローラ21の凸状リブ21aと21aとの間にローラ22の凸状リブ22aが入り込む関係にある。よって、ローラ21とローラ22との間に図示左端方向から帯状の不織布(例えば多層構造の不織布)を挿入すると、ローラ21とローラ22の右端側から山部2Aと谷部2Bとからなる波形状と、前記谷部2B内に所定の間隔Pからなる複数

の連結部2Cとを有する表面シート2を連続形成することができる。

【0058】なお、前記金型11と12または、前記ローラ21とローラ22とを共に70℃～160℃に加熱しておくことが好ましい。これにより、単なる型押しのみによる場合に比べ、波形および連結部2Cの成形性が高まり、型くずれしにくくすることが可能となる。または前記金型11、12または前記ローラ21とローラ22との間を通過させる前段階で、例えば不織布を70℃～160℃の予熱ローラを通過させたり、あるいはホットエアを吹き付ける等の予熱処理してもよい。

【0059】さらに加圧加熱成形後に、例えばコールドエアを吹き付けると、搬送時における形状の歪みをより少なく抑えることができる。

【0060】生理用ナプキン1の製造工程では、裏面シート4の上に吸収コア3が供給され、前記のように形成された前記表面シート2が吸収コア3の上、および吸収コア3の外周に位置する裏面シート4上に重ねられる。このときは、吸収コア3の受液側表面に部分的にホットメルト型接着剤が塗布され、また前記裏面シート4にもホットメルト型接着剤が塗布されている。このホットメルト型接着剤の接着により図2に示す断面構造の裏面シート4、吸収コア3、表面シート2の積層体が形成される。

【0061】なお、前記積層体はさらに加圧ローラ間で加熱状態で挟圧され、図1に示すバイオリン形状の加圧部3aが形成される。

【0062】

【実施例】波形形状に連結部2Cを備えた表面シート(A)からなる生理用ナプキンと、波形形状のみからなる表面シート(B)からなる生理用ナプキンを試作し、その評価試験を行ったので以下に説明する。

【0063】(表面シートの仕様) 2.5デニール×5.1mmの芯鞘型のPE(ポリエチレン)/PET(ポリエチレンテレフタレート)繊維をエアスルー方式でシート化させ、目付け30g/m<sup>2</sup>、CD強度190g/inch、厚さ0.5mmの不織布を試作した、そして、これらのシートを3枚重ねた複合シートとした。

【0064】(波形形状に連結部を備えた表面シート(A)の仕様) 凸状リップ11aの高さh1=5mm、幅方向の間隔W=5mmの多列状金型11(図5参照)と、高さh2=3.5mm、窪み12bの寸法L=2mm、凸状リップ12aの長さP=2.5mmの凸状金型12(図6参照)とを各々80℃と90℃に加熱し、50kgfの圧縮下において1秒間加圧加熱することにより、波形形状に連結部2Cを備えた表面シートを形成した。

【0065】(波形形状のみからなる表面シート(B)の仕様) 上記と同一の多列状金型(高さh1=5mm、幅方向の間隔寸法W=5mm)11を2台用意し、上記複合シートを上下方向から前記2台の多列状金型で加圧

することにより、波形形状のみからなる表面シートを形成した。

【0066】(1)形状回復性の評価試験

(サンプルの仕様) 上記(A)、(B)の各表面シートを各々50mm×50mmの大きさにカットし、坪量120g/m<sup>2</sup>の木材パルプにSAP30g/m<sup>2</sup>をブレンドして2mmの厚さに平プレスした吸収性コア3の上にそれぞれ載せたものを生理用ナプキンのサンプルとした。

10 【0067】(形状回復性の評価試験方法)

①各サンプルの表面シート2の上から、7mlの液体(人工経血)を7ml/minの流量で滴下させ、30秒放置する。

②放置後、各試作片に50g/cm<sup>2</sup>の荷重を5分間付与し、荷重を開放したときの山部2Aの高さHと、荷重付与前の高さH0とを調べる。

③形状回復率=(荷重付与後の高さH)/(荷重付与前の高さH0)×100とし、波形形状に連結部を備えた表面シート(A)と波形形状のみからなる表面シート(B)とを比較することにより評価する。

【0068】(形状回復性の評価試験の結果)

A: 波形形状に連結部を備えた表面シートの形状回復率=60%

B: 波形形状のみからなる表面シートの形状回復率=40%

(2)圧縮回復評価試験

(サンプルの仕様) 上記形状回復性の評価試験用とほぼ同様のサンプルであるが、(A)、(B)の各表面シートの大きさを各々50mm×100mmとした。

30 【0069】(圧縮回復評価試験の方法)

①各サンプルに7mlの人工経血を吸収させる。

②各サンプルに3g/m<sup>2</sup>の荷重を加え、該荷重下における厚み(a)を測定する。

③次に、各サンプルに47g/m<sup>2</sup>の荷重を加え、10分間放置する。

④放置後、3g/m<sup>2</sup>の荷重に戻し、3分間放置して各サンプルの厚み(b)を測定する。

⑤圧縮回復率(%)=b/a×100として、各サンプルの圧縮回復率を求める。

40 【0070】(圧縮回復評価試験の結果)

A: 波形形状に連結部を備えた表面シートの圧縮回復率=55%以上

B: 波形形状のみからなる表面シートの圧縮回復率=50%以下

以上の評価試験の結果から、形状回復率、圧縮回復率ともに波形形状に連結部を備えた表面シート(A)の方が、波形形状のみからなる表面シート(B)よりも優れていることがわかる。

【0071】なお、波形形状に連結部を備えた表面シートでは、連結部の連結部の数を増減することにより、形状

回復率、圧縮回復率を調節することが可能である。

【0072】

【発明の効果】以上詳述した本発明によれば、ソフト感とクッション性に優れた吸収性物品の表面シートを得ることができる。また表面シートに作用する体圧を開放させると、体圧を受ける前の初期のソフト感とクッション性を取り戻すことができる。

【図面の簡単な説明】

【図1】本発明における吸収性物品の実施の形態として生理用ナプキンを受液側から示す平面図、

【図2】図1のX方向の断面を示し、(A)はIIA-II A線断面図、(B)はIIB-IIB線断面図、

【図3】図1のY方向の断面を示し、(A)はIIIA-I IIA線断面図、(B)はIIIB-IIIB線断面図、

【図4】表面シートの部分斜視図、

【図5】表面シートに波形形状を形成する多列状金型の斜視図、

【図6】表面シートに波形形状を形成する凸状金型の斜視図、

【図7】表面シートの他の製造方法の概略図、

\*20

\*【符号の説明】

1 生理用ナプキン（吸収性物品）

1A 肌当接部

2 表面シート

2A 波形の山部

2B 波形の谷部

2C 連結部

2D 長溝

3 吸収コア（吸収層）

10 4 裏面シート

11 多列状金型（第1の成形手段）

11a 凸状リブ

11b 溝

12 凸状金型（第2の成形手段）

12a 凸状リブ

12b 窪み

12c 溝

21 ローラ（第1の成形手段）

22 ローラ（第2の成形手段）

【図1】

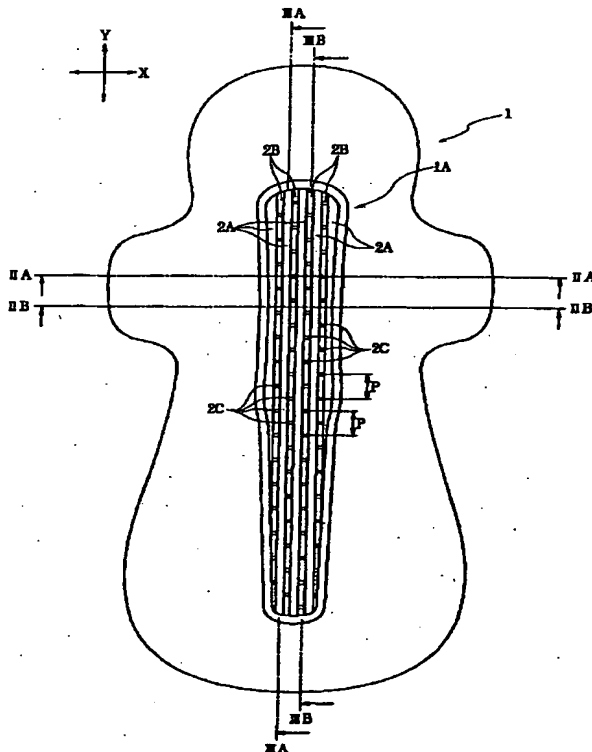


図1

【図4】

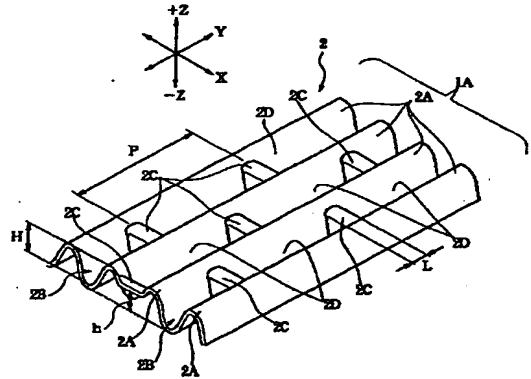


図4

【図7】

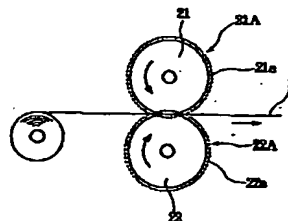
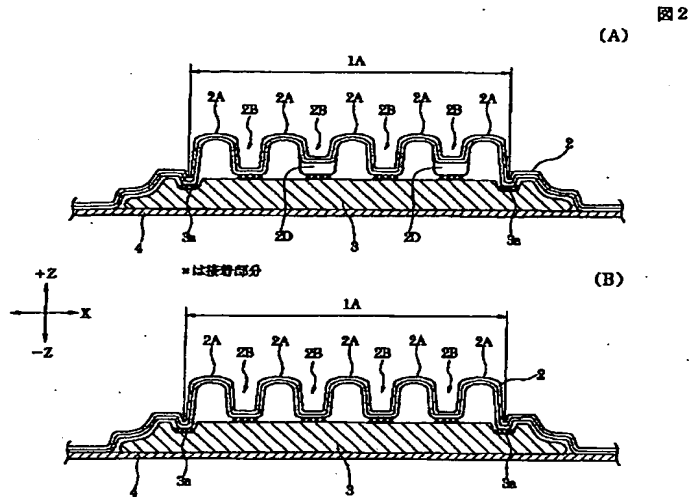
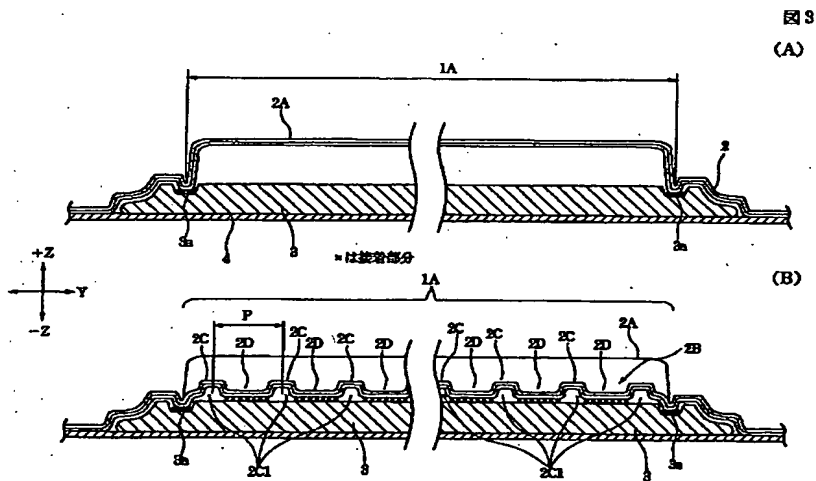


図7

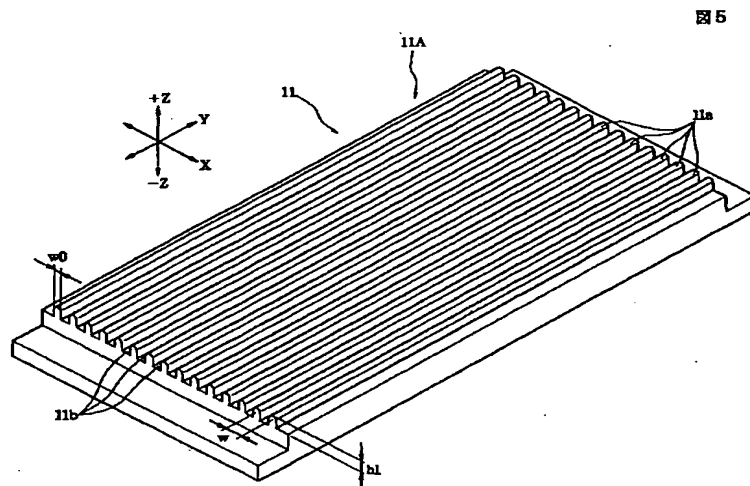
【図2】



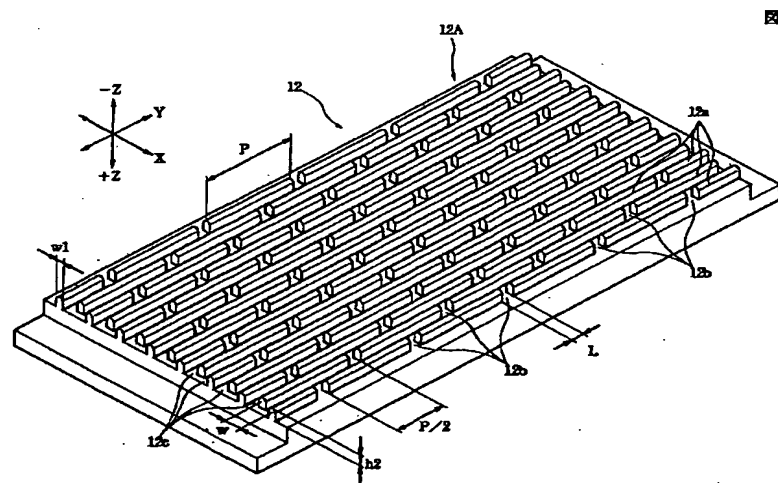
【図3】



【図5】



【図6】



フロントページの続き

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